

Claims

What is claimed is:

1. A method for identifying an unknown MICR character on a document, comprising the steps of:
 - providing a document within an envelope, wherein the document has an unknown MICR character printed with magnetic ink;
 - extracting the document from the envelope;
 - imparting a magnetic charge onto the magnetic ink to magnetize the unknown character;
 - scanning the unknown character with a magnetic read head to obtain a set of data indicative of the unknown character;
 - providing a plurality of predetermined data sets wherein each data set corresponds to a particular MICR character;
 - determining a correlation value of the similarity between each of the predetermined data sets and the data set for the unknown character using cross correlation;
 - identifying the maximum correlation value; and
 - identifying the unknown character as the MICR character corresponding to the data set having the maximum correlation value.
2. The method of claim 1 wherein the step of determining a correlation value using cross correlation comprises the step of determining the sum of the cross product between each of the predetermined data sets and the data set for the unknown character.
3. The method of claim 1 comprising the steps of:
 - incrementally shifting the data to re-order the data for the unknown MICR character to provide a plurality of re-ordered data sets for the unknown MICR character;

determining a correlation value of the similarity between each of the predetermined data sets and each of the re-ordered data sets for the unknown character using cross correlation.

4. The method of claim 1 comprising the steps of:
incrementally shifting the data to re-order the data for each of the predetermined data sets to provide a plurality of re-ordered data sets for each of the predetermined data sets;
determining a correlation value of the similarity between each of the re-ordered predetermined data sets and the data set for the unknown character using cross correlation.
5. The method of claim 1 comprising the steps of determining an offset value for each data set based upon the corresponding mean value of each data set, and offsetting each data point in each data set by the corresponding offset value.
6. The method of claim 1 comprising the step of determining a normalization value for the cross correlation of each data set and the data set of the unknown character and dividing the correlation value by the normalization value.
7. The method of claim 1 wherein the step of scanning comprises conveying the document past the magnetic read head and measuring the magnetic field strength as the document passes the read head.
8. The method of claim 1 comprises the step of an alternative comparison, comprising the steps of:
providing a plurality of alternate data sets corresponding to the MICR characters;

determining a correlation value of the similarity between each of the alternate data sets and the data set for the unknown character using cross correlation;
identifying the maximum correlation value of both the predetermined data sets and the alternate data sets; and
identifying the unknown character as the MICR character corresponding to the data set having the maximum correlation value.

9. The method of claim 8 comprising the step of determining whether the maximum correlation value exceeds a threshold and the alternate comparison is performed if the correlation value does not exceed the threshold.
10. The method of claim 8 wherein the method comprises determining the length of time that it takes the character to pass the read heads, and the alternate comparison is performed if the length of time is above a time threshold.
11. The method of claim 8 wherein the method comprises determining the length of time that it takes the character to pass the read heads, and the alternate comparison is performed if the length of time is below a time threshold.
12. The method of claim 1 comprising the steps of scanning the document to obtain a set of optical image data corresponding to the document, and exporting the optical image data and data regarding the identified MICR character to a data file for the document.
13. The method of claim 1 comprising the steps of determining the orientation of the document and selectively re-orienting the document.

14. The method of claim 13 comprising the step of sorting the document in response to a detected characteristic of the document.
15. The method of claim 1 wherein each cross correlation in the step of determining a correlation value comprises cross correlating the data set for the unknown character and one of the predetermined data sets by determining the product of each data point in the data set for the unknown character with the corresponding data point in the one predetermined data set and summing the products.
16. A method for identifying an unknown MICR character on a document, comprising the steps of:
- providing a document having an unknown MICR character printed with magnetic ink;
 - imparting a magnetic charge onto the magnetic ink to magnetize the unknown character;
 - scanning the unknown character with a magnetic read head to obtain a set of data indicative of the unknown character;
 - providing a plurality of predetermined data sets wherein each data set corresponds to a particular MICR character;
 - determining a correlation value of the similarity between each of the predetermined data sets and the data set for the unknown character using cross correlation;
 - identifying the maximum correlation value; and
 - identifying the unknown character as the MICR character corresponding to the data set having the maximum correlation value.
17. The method of claim 16 wherein the step of determining a correlation value using cross correlation comprises the step of determining the sum of the

cross product between each of the predetermined data sets and the data set for the unknown character.

18. The method of claim 16 comprising the steps of determining an offset value for each data set based upon the corresponding mean value of each data set, and offsetting each data point in each data set by the corresponding offset value.
19. The method of claim 16 comprising the step of determining a normalization value for the cross correlation of each data set and the data set of the unknown character and dividing the correlation value by the normalization value.
20. The method of claim 16 wherein the step of scanning comprises conveying the document past the magnetic read head and measuring the magnetic field strength as the document passes the read head.
21. The method of claim 16 comprises the step of an alternative comparison, comprising the steps of:
 - providing a plurality of alternate data sets corresponding to the MICR characters;
 - determining a correlation value of the similarity between each of the alternate data sets and the data set for the unknown character using cross correlation;
 - identifying the maximum correlation value of both the predetermined data sets and the alternate data sets; and
 - identifying the unknown character as the MICR character corresponding to the data set having the maximum correlation value.

22. The method of claim 21 comprising the step of determining whether the maximum correlation value exceeds a threshold and the alternate comparison is performed if the correlation value does not exceed the threshold.
23. The method of claim 21 wherein the method comprises determining the length of time that it takes the character to pass the read heads, and the alternate comparison is performed if the length of time is above a time threshold.
24. The method of claim 21 wherein the method comprises determining the length of time that it takes the character to pass the read heads, and the alternate comparison is performed if the length of time is below a time threshold.
25. The method of claim 16 comprising the steps of scanning the document to obtain a set of optical image data corresponding to the document, and exporting the optical image data and data regarding the identified MICR character to a data file for the document.
26. The method of claim 16 comprising the steps of determining the orientation of the document and selectively re-orienting the document.
27. The method of claim 26 comprising the step of sorting the document in response to a detected characteristic of the document.
28. The method of claim 16 wherein each cross correlation in the step of determining a correlation value comprises cross correlating the data set for the unknown character and one of the predetermined data sets by determining the product of each data point in the data set for the unknown

character with the corresponding data point in the one predetermined data set and summing the products.

29. The method of claim 16 comprising the steps of:

incrementally shifting the data to re-order the data for the unknown MICR character to provide a plurality of re-ordered data sets for the unknown MICR character;

determining a correlation value of the similarity between each of the predetermined data sets and each of the re-ordered data sets for the unknown character using cross correlation.

30. The method of claim 16 comprising the steps of:

incrementally shifting the data to re-order the data for each of the predetermined data sets to provide a plurality of re-ordered data sets for each of the predetermined data sets;

determining a correlation value of the similarity between each of the re-ordered predetermined data sets and the data set for the unknown character using cross correlation.

31. A method for identifying an unknown marking on a document, comprising the steps of:

providing a document having an unknown marking printed with magnetic ink;

magnetizing the unknown marking;

scanning the document to obtain a set of data indicative of the magnetized marking.

providing a plurality of predetermined data sets wherein each data set corresponds to a known marking;

determining a correlation value of the similarity between each of the predetermined data sets and the data set for the unknown marking, wherein each correlation value is based on the summation of the cross product of the data set for the unknown marking and one of the predetermined data sets; and identifying the unknown marking as the marking corresponding to the data set having the maximum correlation value.

32. The method of claim 31 comprising the steps of determining an offset value for each data set based upon the corresponding mean value of each data set, and offsetting each data point in each data set by the corresponding offset value.
33. The method of claim 31 comprising the step of determining a normalization value for the cross correlation of each data set and the data set of the unknown marking and dividing the correlation value by the normalization value.
34. The method of claim 31 wherein the step of scanning comprises conveying the document past a magnetic read head and measuring the magnetic field strength as the document passes the read head.
35. The method of claim 31 comprises the step of an alternative comparison, comprising the steps of:
providing a plurality of alternate data sets corresponding to the known markings;
determining a correlation value of the similarity between each of the alternate data sets and the data set for the unknown marking using cross correlation;

identifying the maximum correlation value of both the predetermined data sets and the alternate data sets; and
identifying the unknown marking as the marking corresponding to the data set having the maximum correlation value.

36. The method of claim 35 comprising the step of determining whether the maximum correlation value exceeds a threshold and the alternate comparison is performed if the correlation value does not exceed the threshold.
37. The method of claim 35 wherein the method comprises determining the length of time that it takes the character to scan the marking, and the alternate comparison is performed if the length of time is above a time threshold.
38. The method of claim 35 wherein the method comprises determining the length of time that it takes the character to scan the marking, and the alternate comparison is performed if the length of time is below a time threshold.
39. The method of claim 31 comprising the steps of scanning the document to obtain a set of optical image data corresponding to the document, and exporting the optical image data and data regarding the identified marking to a data file for the document.
40. The method of claim 31 comprising the steps of determining the orientation of the document and selectively manipulating either the data set for the unknown marking or the data sets for the known markings.

41. The method of claim 40 comprising the step of sorting the document in response to a detected characteristic of the document.
42. The method of claim 31 comprising the steps of:
incrementally shifting the data to re-order the data for the unknown marking
to provide a plurality of re-ordered data sets for the unknown marking;
determining a correlation value of the similarity between each of the
predetermined data sets and each of the re-ordered data sets for the
unknown marking using cross correlation.
43. The method of claim 31 comprising the steps of:
incrementally shifting the data to re-order the data for each of the
predetermined data sets to provide a plurality of re-ordered data sets for
each of the predetermined data sets;
determining a correlation value of the similarity between each of the re-
ordered predetermined data sets and the data set for the unknown
character using cross correlation.